Elevation Symptom Chart

	AS-2000	AS-3018					C-9597		
	CB2 & CB3	S1 SAFTY SWITCH	CHECK ELE SECTION TP1 / UP & TP2 / DOWN	B4 ELEVATION MOTOR	S4 / UP & S3 / DOWN	B2 ELEVATION MOTOR THERMAL OVERLOAD	ASCOM-T CARD	A1 & A2 ELEC SWITCH CARDS	R4 (ANT #1 UP) R6 (ANT #2 UP) R5 (ANT #1 DOWN) R5 (ANT #2 DOWN)
ELEVATION ONE ANTENNA	2	1	3 NOTE	6A	6B	7	4	3	8

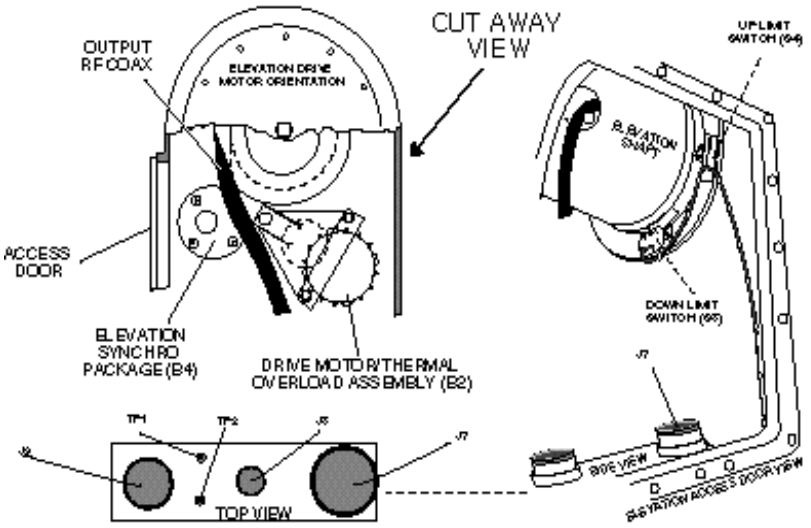
NOTE

VOLTAGE SHOULD BE 2.5 TO 5.0 VRMS
400 HZ AT PEAK OF ACTUATION
IF READING IS GOOD GOTO STEP (8,7)

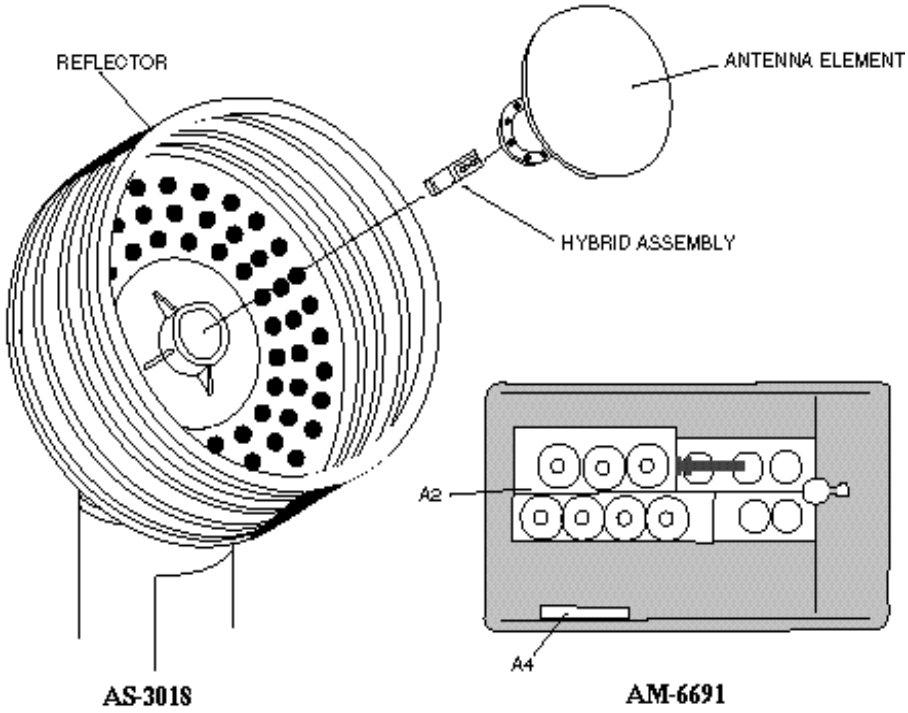
RF Symptom Chart

	SA-2000		AM-6491	AS/3018
	K1 SATCOM RCV	K2 SATCOM XMIT	A4 UHF PREAMP	HYBRID ASSEMBLY
BITE 12 FAILS IN ONE ANT		2		1
POOR RCV ONE ANT	2		1	

AS-3018 Antenna Elevation Parts Layout



RF System Parts Layout



OE-82C/WSC-1 (V) Troubleshooting *(Cont.)*

Pedestal & Control Symptom Chart

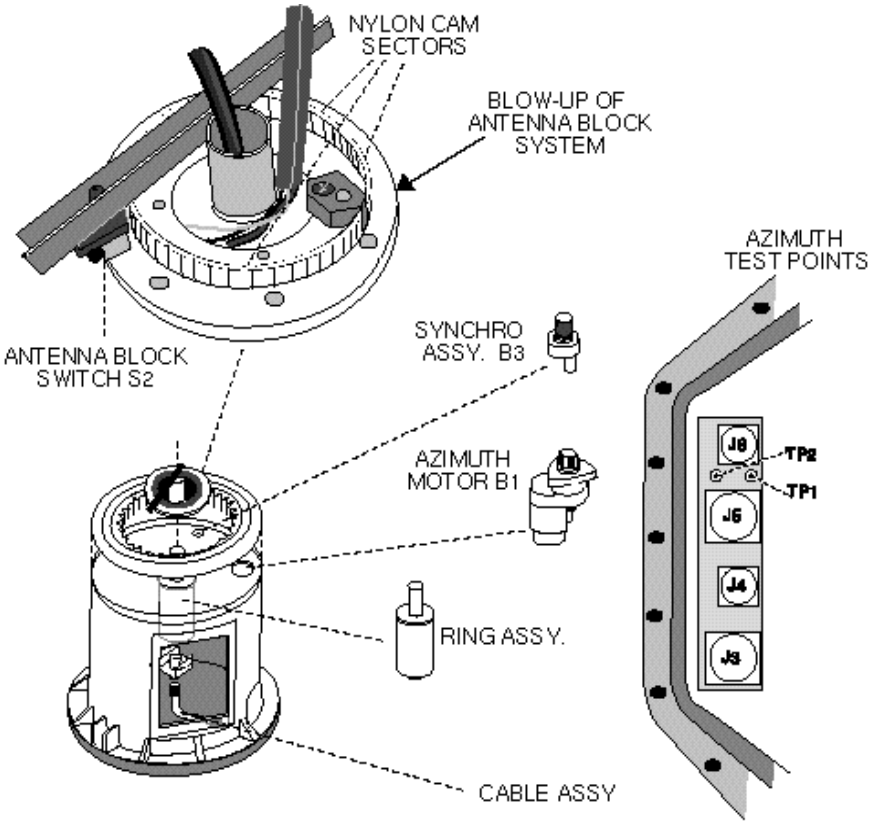
	SA-2000	C-9597					AS3018	
	CB-2 & CB3	B1 EL SYNCRO	B2 AZ SYNCRO	A3 SCOTT-T CARD	A1 & A2 ELEC SWITCH CARDS	K2 (ANT. #1 CW) K3 (ANT. #2 CW) K1 (ANT. #1 CCW) K7 (ANT. #2 CCW)	S1 SAFETY SW	CHECK AZ SECTION TRACW & TRACCW (IF GOOD, CHECK B1 THEN RELAYS STEP 6) (IF BAD CHECK B3)
ELEVATION FAILED BOTH ANTENNAS	1	4		2			3	
AZIMUTH FAILED BOTH ANTENNAS	1		4	2			3	
AZIMUTH FAILED ONE ANTENNA	2			4	3	6	1	5 (NOTE)

NOTE
VOLTAGE SHOULD BE
2.5 TO 5 VRMS 400HZ
AT PEAK OF ACUATION

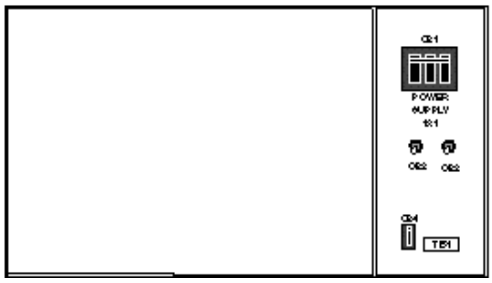
Power Supply Symptom Chart

	C-9597		SA 2000			
	F1 / S1	K10	CB1 THRU CB4	TB1 CONTACTS1 OR 2 (OUTPUT OF 1A1, 28VDC)	K1	CR1 (ANT#1),CR2 (ANT#2)
POWER LAMP	1		2	3		
ANTENNA BLOCK LAMP		1				
BITE 11					1	2

AS-3018 Azimuth Parts layout

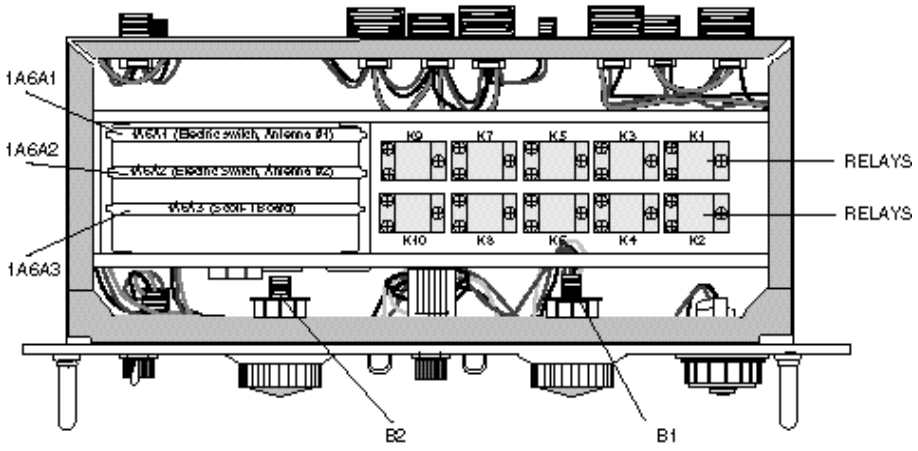


SA-2000 Switch Layout

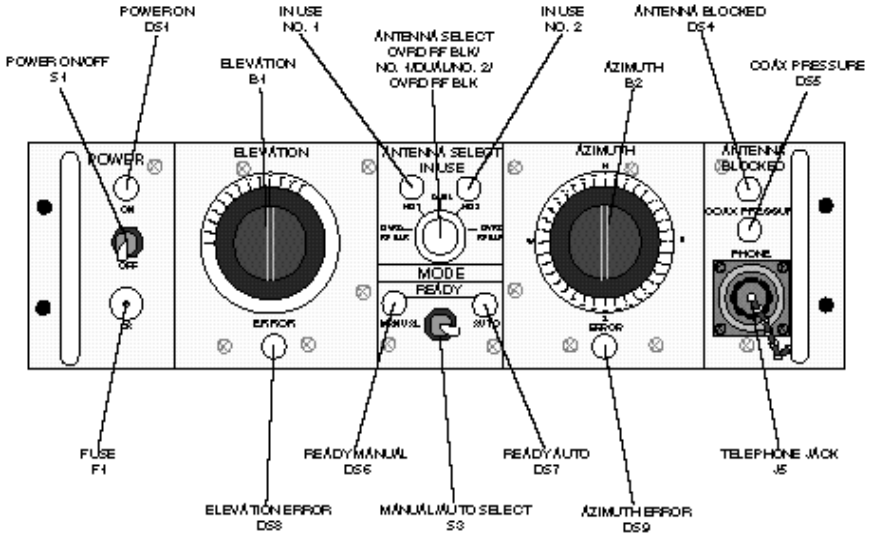


C-9597 Antenna Controller Parts Layout

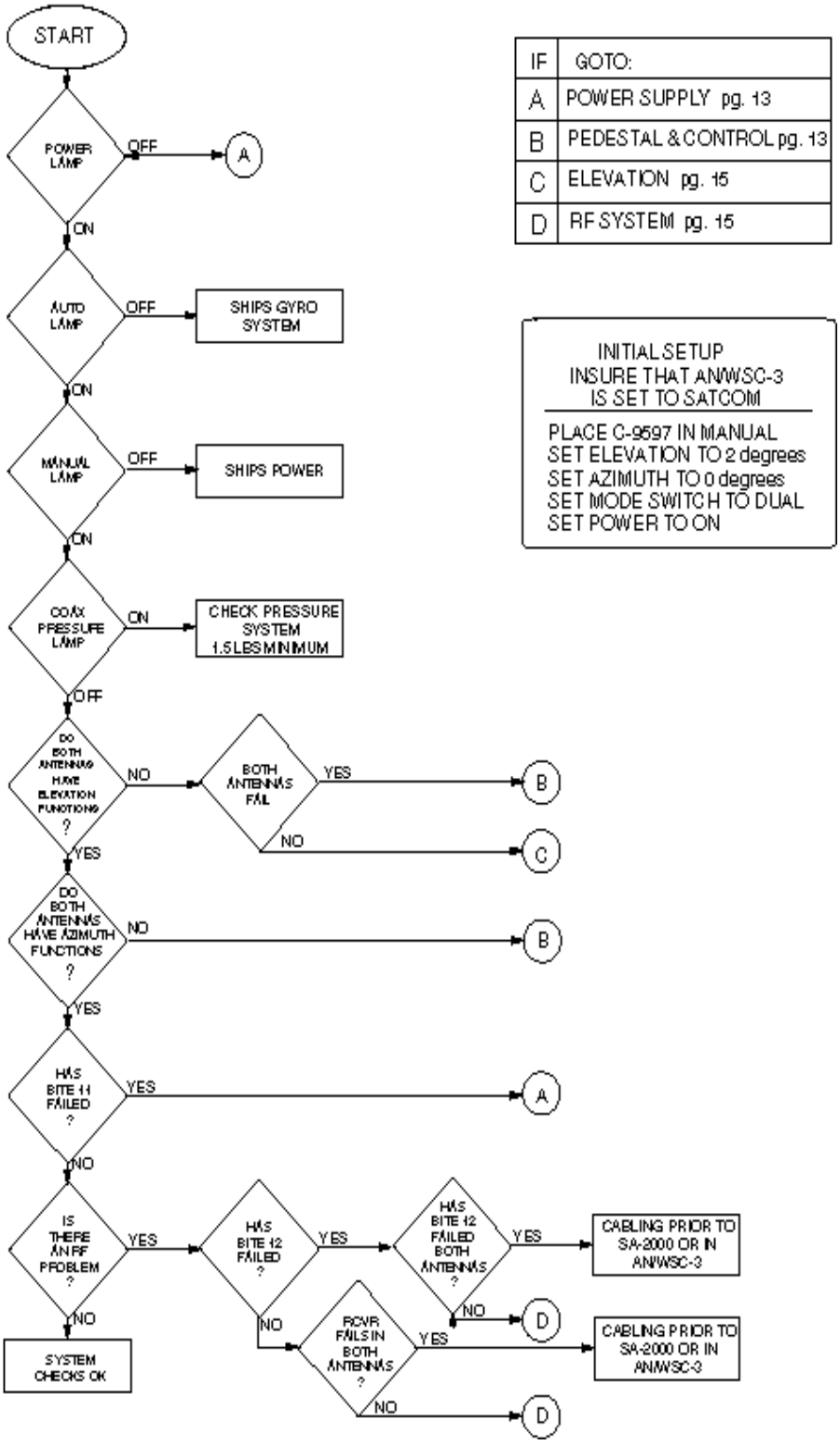
TOP VIEW



FRONT PANEL



System Symptom Flow Chart



OE-82C/WSC-1 (V) Troubleshooting

Preliminary

The Key to effective use of this guide is symptom recognition. Following the procedure given below should result in quick location of most common faults:

Do a FULL functional check of the antenna system taking careful note of any symptoms or malfunction. (The Symptom Flow Chart is a modified functional check of the antenna system)

Use the Symptom Flow Chart to isolate the problem to one one of the following parts of the radio system:

A: Power Supply

B: Pedestal & Control

C: Elevation

D: RF system

Go to the Symptom Table indicated by the Symptom Flow Chart. Preceeding in numerical order through the appropriate symptom row and inspect, test, adjust, or replace the item indicated in the column heading.

Upon completion of the troubleshooting procedure, do another FULL functional check of the antenna system to ensure no problems remain.

OE-82C/WSC-1 (V) Antenna Group *(Cont.)*

Job Steps *(Cont)*:

28. Place Safety switch to the up (ON) position.

29. With Multimeter on AC scale, place probes at P2-H and P2-J.

30. Rotate Azimuth Control knob from Null to Maximum. Take reading on multimeter.

_____ to _____ Vac

31. With multimeter on AC scale, place probes at P2-H and P2-K.

32. Rotate Azimuth Control knob from Null to Maximum. Take reading on multimeter.

_____ to _____ Vac

33. Place Safety switch to the down (SAFE) position.

34. **DE-ENERGIZE** the Antenna Group.

35. Disconnect P1 from J1.

36. Place Safety switch to the up (ON) position.

37. With multimeter on the resistance scale, measure continuity from the following points:

J1-H to J1-J_____ohms J1-H to J1-L_____ohms

J1-H to J1-K_____ohms J1-H to J1-U_____ohms

J2-D to J1-E_____ohms J2-F to J2-G_____ohms

38. Reconnect P1 to J1.

39. Reconnect P2 to J2.

40. Replace elevation and azimuth compartment covers.

41. Properly Stow equipment.

OE-82C/WSC-1 (V) Antenna Group *(Cont.)*

Job Steps *(Cont)*:

_____ to _____ Vac

12. With multimeter on AC scale, place probes at P7-D and P7-F.

13. Rotate Elevation Control knob from Null to Maximum. Take reading on multimeter.

_____ to _____ Vac

14. With multimeter on DC scale, read voltage at P7-N to ground.

_____ Vdc

15. Place Safety switch to the down (SAFE) position.

16. Reconnect J7 to P7.

17. Disconnect P9 from J9.

18. Place Safety switch to the up (ON) position.

19. With multimeter on DC scale, read voltage at J9-E to ground.

_____ Vdc

20. Place Safety switch to the down (SAFE) position.

21. Reconnect P9 to J9.

22. Place Safety switch to the up (ON) position.

23. Set Elevation to 45 degrees.

24. With multimeter on DC scale, read the voltage from:

S3-NC to ground _____Vdc S4-NC to ground _____Vdc

S3-NO to ground _____Vdc S4-NO to ground _____Vdc

S3-C to ground _____Vdc S4-C to ground _____Vdc

25. Place Safety switch to the down (SAFE) position.

26. Remove azimuth compartment cover (lower compartment).

27. Disconnect P2 from J2.

OE-82C/WSC-1 (V) Antenna Group Voltage/Waveform Measurements

Introduction

This Job Sheet will provide proper procedures to do voltage and waveform checks on the OE-82C/WSC-1 (V) Antenna Group. This knowledge will assist in troubleshooting malfunctions in the Antenna Group.

WARNING

This equipment employs high voltages which are dangerous and may be fatal if contacted. Extreme caution should be exercised when operating or repairing this equipment. DO NOT remove access covers until the safety switch has been placed to the down (SAFE) position.

Job Steps:

1. Using Table 2-2 in SPAWAR 0967-LP-614-0010, perform the Turn-on procedure.

2. With equipment energized, ensure antenna elevation is zero degrees.

   NOTE: Either AS-3018 (Ant. #1 or #2) can be used for the remaining steps.

3. Place Safety switch to the down (SAFE) position.

4. Remove elevation compartment cover (uppermost compartment).

5. Place Safety switch in to the up (ON) position. With multimeter on AC scale, place probes in TP1 and TP2.

6. Introduce 90 degrees elevation error into system and read multimeter at:

   a. At beginning of movement_____Vac

   b. At end of movement_____ Vac

7. Place Safety switch to the down (SAFE) position.

8. Disconnect J7 from P7.

9. Place Safety switch to the up (ON) position.

10. With multimeter on AC scale, Place probes at P7-D and P7-E.

11. Rotate Elevation Control knob from Null to Maximum. Take reading on multimeter.

Problems *(Cont.)*

4. Using the AUTO mode and the following parameters, solve for the Azimuth and Elevation settings on the C-9597A/WSC-1(V) Antenna Control as well as the looking angle:

Given: Ship's Heading = 270 degrees true
Longitude = 030 degrees West
Lattitude = 060 degrees North
Satellite = FLTSATCOM (100 degrees West)

AZ =_____ EL =_____

Looking angle = _____

5. Using the AUTO mode and the following parameters, solve for the Azimuth and Elevation settings on the C-9597A/WSC-1(V) Antenna Control as well as the looking angle:

Given: Ship's Heading = 270 degrees true
Longitude = 121 degrees East
Lattitude = 011 degrees North
Satellite = FLTSATCOM (177.5 degrees West)

AZ =_____ EL =_____

Looking angle = _____

OE-82C/WSC-1 (V) Antenna Group Basic Operation

Introduction

This Problem Sheet will assist you in using the Equatorial Antenna Pointing Guide to solve for azimuth and elevation for the AUTO mode of antenna positioning. Also discused will be the formula to calculate azimuth, also called "looking angle", and elevation for the MANUAL mode.

To solve for Looking Angle in the MANUAL mode use the following:

360
- Ships Heading
Result
+ Auto Azimuth Results
Looking Angle

Problems

1. Using the AUTO mode and the following parameters, solve for the Azimuth and Elevation settings on the C-9597A/WSC-1(V) Antenna Control:

Given: Ship's Heading = 161 degrees true
Longitude = 127 degrees West
Lattitude = 036 degrees North
Satellite = FLTSATCOM (171 degrees West)

AZ =_____ EL =_____

2. Using the parameters given above, what is the looking angle when the antenna is used in the MANUAL mode?

Looking angle = _____

3. Using the AUTO mode and the following parameters, solve for the Azimuth and Elevation settings on the C-9597A/WSC-1(V) Antenna Control as well as the looking angle:

Given: Ship's Heading = 315 degrees true
Longitude = 067 degrees West
Lattitude = 12 degrees North
Satellite = LEASAT (022 degrees West)

AZ =_____ EL =_____

Looking angle = _____

OE-82C/WSC-1 (V) Antenna Group *(Cont.)*

Antenna Control 1A6

The C-9597 antenna control unit contains the antenna azimuth / elevation controls and indicating lamps that show the status of the antennas. The internal electronic circuits control the rotation of the antennas, determine which indicating lamps are lit while the antennas are in motion, and provide reference signals for the synchro data packages in both antenna pedestals. A sound-powered telephone circuit is terminated at the antenna control to permit conversations with personnel at the pedestal locations during maintenance procedures.

OE-82C/WSC-1 (V) Antenna Group

Overview

The OE-82/WSC-1 (V) is the Antenna Group for the UHF Satellite Communications System. It may consist of a single or dual antenna installation with its associated amplifier-filter assembly, a switching unit, and an antenna control.

Antenna 1A1 and 1A2

The AS-3018 antenna constists of a crossed-dipole element mounted about a ground screen. A 90-degree hybrid junction, two combining networks, and a terminating load are contained in the dipole housing. This assembly radiates a right-handed circularly polarized electromagnetic wave in the UHF band from 240 through 318 MHz. The ground screen assembly is attached to a pedestal that permits it to be rotated through 360 degrees of azimuth and from the horizon to approximately 10 degrees beyond zenith (+2 to 110 degree elevation angle). The upper compartment of the pedestal contains the elevation drive motor and its associated syncro data package. The lower compartment antenna pedestal contains the azimuth drive motor and its associated syncro data package. A sound-powered telephone circuit is terminated in the lower compartment, permitting maintenance conversations with personnel at the antenna control.

Amplifier-Filter, Bandpass 1A3 and 1A4

The amplifier-filter bandpass contains a diplexer to decouple the transmit and receive signal paths and a receive signal preamplifier. The diplexer provides up to 120 dB of isolation and the pre-amplifier provides approximately 26dB gain to the receive signal. Each amplifier-filter is a weatherproof enclosure that can be secured to the deck near the base of the antenna. Dry air is used to demoisturize the receive and transmit coaxial cables connected to the amplifier-filter and the diplexer and receive preamplifier inside the enclosure.

Switching Unit 1A5

The SA-2000 switching unit contains a main power and individual antenna circuit breakers, a 440/208 Vac transformer, a 28 Vdc power supply, a 20 dB signal sampler, and five coaxial relays. The main power circuit breaker protects and interrupts the 440 Vac ships power applied to the switching unit while the idividual circuit breaker protect and interrupts the 208 Vac drive motor power to the antenna pedestal. The 28 Vdc power circuit breaker is used to protect the dc output of the 28 Vdc power supply from overload and to interrupt it for test purposes. The coaxial relays route transmitted and received signals between the radio set group, the two antennas (1A1 and/or 1A2), and the line of sight (LOS) antenna.

OE-82C

Repair

Guide

Comms Branch

TRACEN Petaluma